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THE NORTH CAROLINA
COLLEGE OF AGRICULTURE AND MECHANIC ARTS
AGRICULTURAL EXPERIMENT STATION
W. A. WITHERS, M.A., ACTING DIRECTOR

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Experiments with Field and Forage Crops

I. SEEDING FOR PASTURE;
II. PERMANENT IMPROVEMENTS;
III. TIMOTHY SEEDING;
IV. IMPROVEMENT OF PEANUTS;
V. COTTON VARIETIES, 1898;
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VIII. VARIETY TEST OF WHEAT, 1898-'9.

F. E. EMERY

RALEIGH, N. C.
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Publications will be sent to any address in North Carolina upon application.

* Delayed in preparation.

THE NORTH CAROLINA COLLEGE OF AGRICULTURE AND MECHANIC ARTS

AGRICULTURAL EXPERIMENT STATION

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The Station is glad to receive any inquiries on agricultural subjects. *Address all communications to the Agricultural Experiment Station, and not to individuals.* They will be referred to the members of the Station staff most competent to answer them.

Samples for analysis should be sent to the State Chemist.

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*Member of Station Council.
(1) On leave [of absence.

EXPERIMENTS WITH FIELD AND FORAGE CROPS.

By F. E. EMERY, M.S., Agriculturist.

I. SEEDING FOR PASTURE.

In the fall of 1890 very soon after assuming charge of the Experiment Farm two acres were seeded for pasture. The land was thin and very poor.

This was the treatment it received and the result:

20 pounds, 1⅝ bushels, Tall Oat Grass Seed.
10 pounds, ⅝ bushel, Orchard Grass Seed.
2 pounds, ⅛ bushel, Red Top Grass Seed.
4 pounds, ⅛ bushel, Kentucky Blue Grass Seed.
15 pounds, ¼ bushel, Red Clover Seed.

Manure was spread and cut in with disk harrow in fitting for seed over the poorer part of the field. Afterward a light top dressing of manure was given. The seed was sown October 12th, 1890. In June, 1891, most of this lot was cut over for hay, and when a little later aftermath had started well it was pastured. This was used for nearly three years, and was heavily stocked for the area and yielded very well as a grazing lot.

In 1893 this pasture was plowed and grew corn, and after the corn was a part of four acres seeded again for pasture. The seeding this time was done in midsummer, the seed being sown August 14th, 1893.

The seeding this time was as follows for four acres:

56 pounds Orchard Grass Seed (*Doctylis glomerata*).
30 pounds Red Top (*Agrostis vulgaris*).
28 pounds Kentucky Blue (*Poa pratensis*).
20 pounds Red Clover Seed (*Trifolium pratense.*)
10 pounds White Clover Seeds (*Trifolium repens*).
1 pound Alsike Clover Seed (*Trifolium hybridum*).

This was at rate of two bushels and one-half pound of best grass seeds per acre, with 5 pounds red clover, 2½ pounds white clover, and ½ pound of alsike clover seed per acre.

This grass did well during the fall and winter, and few people have seen a more luxuriant pasture than the Station cows and sheep luxuriated in during the summer of 1894.

But it must be said that in the preparation for this pasture the whole field received 6¼ tons per acre of stable manure and 5 tons in all of spent manure, over half of which had been washed into the soil elsewhere. This was put on during the winter of 1893, and the

field was then plowed and grew a crop of corn. It was in this field of corn, which yielded 10.85 tons per acre of well cured corn for the silo, that the accompanying reproduction of a photograph was taken, showing corn and Johnson grass *(sorghum halapense),* which grew up with the corn. Cutivators purposely left it. The corn was cut July 26 to August 10, 1893, and the ground immediately plowed with single plows, except the stiffest half acre, and the seed put in as given above.

After the Page woven wire fence, which has been so satisfactory an investment, was put in and two acres more added to the pasture, a mixture of a large number of odds and ends in grass seeds was sown on the new part.

With this grass seed, much of which was old and dead, was sown a few clover seeds, as follows:

Common Red Clover Seed, 1⅝ pounds per acre.
Perennial Red Clover, 2 pounds per acre.
White Clover, 3 pounds per acre.

This part of the pasture for a long time when white clover was in bloom seem as though there need have been no other plants on the field for a luxuriant growth.

This seeding has given most excellent results until it was overpastured too long, 1897-1898, when it became necessary to plow it again for renewal and to close out animal parasites, which have attacked sheep strongly, and which breed in the moist ground.

This year (1899) there is a luxuriant growth of corn on the whole six acres.

Any one advocating sowing down pasture or lawn grasses without white clover has not mastered the reason for things. This clover is very desirable for its after effect on the grasses, affording them really a considerable amount of food in decaying stems and roots.

The dairy field at A. & M. College was seeded for pasture September 30, 1898.

This field produced a very heavy crop of corn, 17½ tons per acre for the silo, and was immediately prepared for pasturing cows as a night pasture and other use. Sowed 500 pounds chemical manure, which was harrowed in previous to sowing the seed. This consisted of:

The grass seeds sown were for four acres.

	Total.
Orchard Grass (*Doctylis glomerata*). 3 bushels	42 pounds.
Kentucky Blue (*Poa pratensis*), 2 bushels	28 pounds.
Tall Meadow Oat (*Avena salva*)	42 pounds.
Meadow Fox Tail (*Aloperensus pratensis*). 3 bushels	21 pounds.
Creeping Bent { (*Poa compressa*). 2 bushels	28 pounds.
Creeping Bent { (*Agrostis stolorrifera*)	14 pounds.
White Clover (*Trifolium repens*)	3 pounds.
Red Clover (*Trifolium pratense*)	16 pounds.

Messrs. Johnson and Skinner have ordered the grazing, and no particularly accurate account of the number of animals fed can be given, but it has been taken down nearly accurate by Mr. Johnson, as follows:

April and May 35 cattle 10 days, equivalent to 350 for one day.
May, June and July 9 cattle 90 days, equivalent to 810 for one day.
August to 23d 3 cattle 23 days, equivalent to 69 for one day.
May, June, July and August 3 horses 35 days, equivalent to 105 horses one day.
May, June, July and August 2 mules 35 days, equivalent to 70 mules one day.

Messrs. Johnson and Skinner estimated the horses and mules as equivalent to 8 cattle, and summed up the amount of grazing to have been *not* less than 1,529 days for one animal between turning out in April and August 23rd.

The grass is still thrifty, though rather short to go into hot weather, but the clover is in active growth, and since the recent rains if not pastured much now until the growth covers the crowns, and some shade is thus afforded from the hot sun, the amount of grazing which can be taken before April next year may nearly equal what has already been secured. Great care should be exercised to keep the land from being grazed too close. Better a light growth wasted in early fall and at mid-winter than to have the bare crowns of the plants exposed to the September sun or to chance freezes in winter.

II. PERMANENT IMPROVEMENTS.

During the period October, 1890, to August, 1899, during which Experiment Farm has been under the charge of the writer there has been a very marked increase in the fertility of the farm. This has been due to the following:

1st. Keeping some kind of crop on the land nearly all the time.

2d. Changing the crops from so-called gross-feeders to recuperative crops so-called.

3rd. To the free use of stable manure from well-fed stock. This is one of the chief causes of improvement, coupled with constant attention to growing crops to give the necessary work as soon as needed, and thus save the water in the soil to the plants.

This last is of so much importance that a *press service bulletin* was devoted to it early in this period, which bulletin was widely copied and disseminated by agricultural and other papers.

The office building was made larger by the addition of a needed second story.

The barn shed was fitted up expressly for cattle feeding experiments, and is as convenient and well-suited a place for such experiments as can be found. See Bulletin No. 143, p. 188.

The barn water supply, consisting of a 13,000 gallon tank set into the ground on a slope at northwest corner of barn, two to four feet, has been one of these, though not really a "permanent" supply,

since the tank will eventually need to be renewed. However, for over eight years this tank has contained rainwater enough for all uses at the barn, where one horse, a pair of mules or work horses, and as high as fifteen head of cattle have been supplied the year round from the rainfall on the barn. So long as this climate continues to average 50 inches of precipitation it seems necessary only to proportion the area of collecting surface, and volume of stored water to the needs for work in hand to be sure of a bountiful supply.

Farmers would do well to note this source of really good water for many purposes in places where good pure water is otherwise not easy to obtain.

The Page wire fence, shutting in six acres for pasture, or other use, is one of the permanent improvements, as is the change from the old board fence on the north to Page wire fence.

This change needs to be continued round on the west and south sides.

The improvement in the land has been the most notable feature.

When it came under this management all experiment work had been abandoned, except a little variety testing, and this by the Horticultural Division was soon abandoned.

When the farm was projected here it was the opinion of the Commissioner of Agriculture at the time that the land was "fit for nothing but ballast."

These years of cattle raising and cropping has not only raised the condemnation for barrenness, but within the past year the same horticulturist, who abandoned the place as unfit for experiments, has concluded it is "the only fit place" for his work. He has also been extolling the system used to bring up this land which was so severely condemned, and which we honestly believe is well worth the earnest interest of thousands of North Carolina farmers.

See reports of addresses by Agriculturist at Farmers' Institutes and those of the Horticulturist, August, 1899, for confirmation.

The steam power and machines of greater capacity have been added.

Repairs to pipes and porches to dwelling, as well as attention to its roof, are now needed.

Some tile drains have been laid for experimental observation, and a temperature and soil moisture apparatus purchased to use in this connection.

III. TIMOTHY SEEDING

The accompanying cut shows a plat of Timothy at the Experiment Farm. This grass grows from seed here as well as in the North. It is cheaper to seed with Timothy than with most other grasses, eight to twelve quarts of seed being required per acre. A fall seeding on rich ground sown early, or on later sowing and followed by a mild winter can be depended on for hay in May or June.

TIMOTHY—N. C. Agricultural Experiment Station.

But, it is not sure at all of withstanding the summer's heat. The bulbs at the base of the stems are injured by dry sun heat, and the grass dies.

Timothy will do for a single cutting, and grown in this way will afford good hay.

IV. IMPROVEMENT OF PEANUTS.

This experiment was begun several years ago, but moles destroyed so much of the seed there was only scattering hills harvested.

In 1898 a plat was planted from seed selected as follows: A lot of Virginia peanuts were assorted into one celled, two celled, three celled and four celled pods. The meats shelled out of these several lots were planted separately, as the beginning of a trial, to find out if possible what changes can be wrought by such selection in peanuts under like and favorable conditions of growth. Only good meats were used, except in some cases, where rows were planted with meats from "partly filled" two, three or four celled pods, as distinguished from full pods.

The seed was planted April 29, 1898. All rows had vegetated by May 12th, and bloom was found on every row by June 12th.

After planting an application of lime was made on the plat, sowing it both ways, so it would be evenly distributed over the whole plat. No other manure was applied. The plat used was S. W. corner of old wheat plats and S. end of original comfrey plat.

The table following gives some statistics of this crop. The first weights were made as the nuts were picked off and sorted in the field.

The original seed contained many "pops," and was, therefore, rather unsuited to yield a fair proportion of the different meated pods, so no counts and weights were made beyond securing good seed. It is seen by the table that about five per cent. of this first crop from selected seed was single-meated pods, thirty per cent. double-meated pods and over fifty per cent. three-meated pods. There were about fourteen per cent. four- meated pods. These proportions were singularly alike from each classification in this first crop. The greatest tendency is to produce pods containing three meats and next with two meats under favorable conditions.

This crop yield was of 121 bushels per acre, since the hills were 2 by 3 feet apart, and one-third of a pound was the average yield per hill.

This serves as a basis on which to determine whether selection for several years turns the force of inheritance toward the same number of meats per pod as the seed-pods contained or toward more or less.

Yield.—The whole plat was 42x60 feet, comprising 2,520 square feet. The yield of 114.85 pounds of peanuts when assorted in December was, therefore, at the rate of 99.26 bushels of 20 pounds per acre.

RESULTS ON THE PEANUT PLATS.

Seed Planted from Kinds of Pods.	No. of Hills.	Harvest Weights.		Weights as Sorted Dec. 5, 1898.				Total Weight.	Weight per Hill.	Per Cent of Crop in			
		Vines.	Pods.	1-Celled.	2-Celled.	3-Celled.	4-Celled.			1-Celled	2 Celled.	3-Celled.	4-Celled.
		Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*				
Partly filled 4-celled pods	23	15½	12.60	.45	1.90	2.90	.95	6.20	.27				
Full 4-celled pods	16	11½	6.70	.30	1.85	3.70	1.00	6.85	.428	5.32	28.72	51.28	14.68
Partly filled 4-celled pods	25	15½	10.80	.50	3.00	5.45	1.50	10.45	.418				
Partly filled 3-celled pods	25	15	9.20	.45	2.70	4.95	1.35	9.45	.378	4.87	30.19	51.79	13.15
Full 3-celled pods	52	35	21.50	1.05	6.60	11.00	2.70	27.35	.391				
Half filled 2-celled pods	16	11	5.60	.35	1.80	2.85	.75	5.75	.36	5.77	30.72	50.31	13.20
Full 2-celled pods	50	33	18.625	1.05	5.65	9.35	2.45	18.50	.37				
1-celled pods	80	46	.....	1.25	7.35	13.60	3.60	25.80	.3225	5.24	28.51	52.20	14.05
1-celled pods	54	24	10.20	.65	3.00	5.35	1.50	10.50	.194				
	341	.....	.....	6.05	33.85	59.15	15.80	114.85	.337	5.27	29.47	51.50	13.76

V. COTTON: COMPARISON OF TWO VARIETIES, 1898.

Two varieties of cotton were planted on carefully measured plats of one-tenth acre each. The plats were treated exactly alike in preparation and manure.

One, the north plat, had a tree on each corner next to the road, which took up quite one square rod of the plat, and on which little cotton could grow. King's cotton was planted on this north plat. Anson Queen, from T. C. Robinson, of Anson county, was planted on the adjacent plat, both in rows equally distant and extending east and west.

The cotton was planted April 26, 1898.

The cultivation given these plats was the same given other crops. The Iron Age cultivator was used as often as needed after each rain or shower to keep the soil from becoming encrusted and hard.

The first picking of cotton was made on September 7th.

On account of the small area and our desire to secure the whole crop the cotton was picked over about once a week until it had all opened.

The King cotton was about two-thirds out in September, while the greater part of Anson Queen was picked in October; the latest part of the crop being on the southwest corner, where the weed was rankest.

The yield from the King cotton was at ginning 186.625 pounds.

The yield from Anson Queen was at ginning 198.5 pounds.

The gin gave the following result:

	Pounds of Seed.	Pounds of Lint.	Per Cent of Seed.	Per Cent of Lint.
King's No. 1	118.5	67.5	63.7	36.3
Anson Queen	131.25	66.75	66.9	33.1

VI. SACHALINE, OR SAGHALIN.

(*Polyganum Saghalinense.*)

Two roots of this highly recommended forage plant were set a yard apart in the spring of 1895. One cutting was made of the earliest shoots; the plants were cultivated in July, and the second growth left to fall after frost. First cutting 4 feet tall.

One plant has thriven and the other did not. The east plant was taken up in 1898, and as many sets made as could be, and these were put out in a row, but were rather slow to start, and were plowed up. The stronger hill continued to thrive, and now 1899, after one cutting this season, is luxuriant enough to cover about four square yards, and is in full bloom in August.

The cuttings have been calculated at one square yard, and are shown below. When two cuttings have been made there has been a smaller growth before the close of the season, which has been left standing over winter.

The plant is when vigorous inclined to spread out from the center by subterranean branches.

	EAST HILL.			WEST HILL.		
	No. Stems Cut.	Pounds Cut.	Rate per Acre.	No. Stems Cut.	Pounds Cut.	Rate per Acre.
			Lbs.			*Lbs.*
May 9, 1896	?	$\frac{7}{8}$	424.	26	$4\frac{5}{16}$	25900.
June 17, 1896				?	$3\frac{1}{2}$	16940.
June 2, 1897*	9	$\frac{7}{16}$	2117	29	$3\frac{13}{16}$	18450.
May 11, 1898†		$\frac{28}{64}$	424.	40	$6\frac{8}{32}$	30855.
June 15, 1898	12	$1\frac{3}{4}$	8470.	36	$7\frac{1}{32}$	34485.
May 10, 1899				?	$9\frac{3}{4}$	47190.

This crop might be grown for forage on small areas where it could be cut over several times, and would probably pay for cultivation by intensive milk producers. Other than intensive growers should not try it.

VII. PRICKLY COMFREY.

(Symphytum Asperrimum.)

This plant has been in use for forage in this country a comparatively short time.

Peter Henderson says of it:**

"*S. asperrimum* was introduced into this country as a forage plant in 1875, but has proved to be entirely valueless for that purpose. Propagation by seeds or division."

Dr. Henry Foster, Clifton Springs, N. Y., began using this plant in 1880 or 1881, and after five years of successful cultivation became enthusiastic in its praise. The New York State Experiment Station procured a stock of plants for one-twentieth acre and cultivated the plant, increasing the area to one-fifth, and later to one and one-fourth acres, feeding the forage to cows and pigs.

A trial to make it into silage resulted in failure. The plant is illy suited to such use, while it is well suited to cultivation on small

* Severely cut back by frost early in season.
† Spring growth severely injured by frost in the early part of April.
** Henderson's Handbook of Plants and General Horticulture.—p. 442.

areas of very rich land. Dr. Foster had about five acres under cultivation in comfrey in 1886 and cut it over as many as five times, manuring and cultivating the ground immediately after each cutting.

The Assistant Chemist of the New York Station, Prof. E. F. Ladd, made several analyses of the forage. As no analyses of this plant have been made here we append copy of those made in New York:*

Samples From—	Water.	Ash.	Albuminoids.	Crude Fiber.	N. Free Extract.	Fat (Ether-Extract.)
Dr. Foster, fresh substance	88.24	1.64	1.88	2.66	5.27	0.31
Station, fresh substance	88.70	3.16	3.69	3.19	10.42	0.84
Crop of 1884, fresh subst'ce	86.14	2.56	3.25	2.00	5.68	0.37
Dr. Foster, dry substance		13.93	16.00	22.66	44.76	2.65
Station, dry substance		14.83	17.31	14.98	48.91	3.97
Crop of 1884, dry substance		18.45	23.44	14.43	41.02	2.66

These analyses show some variations and indicate that about one-eighth of the fresh plants is dry matter.

Samples of comfrey were sent out to other Stations from New York. A plat was planted here at Experiment Farm soon after the reorganization as an U. S. Hatch Station, and comfrey has been continuously grown here since that year, 1889. The plat has been moved three times, and each time it has seemed to grow as well or better for the change as when it remains for a long time in one place. Indeed, the frequent cultivation after manuring with stable manure and the penetration of its deep fleshy roots seem to leave the land in much better condition than it is when the comfrey is put on it.

The *Boraginaceae*, to which this plant belongs, is subject to attack of fungus, one or more of which have been present on our plats, as indicated by certain plants dying down, while the most of the area was in active growth. In some seasons this, or a lack of water, has prevented cutting more than two or three times. When planted in shallow soil, with impervious clay subsoil, the third growth (1898) has withered down and shrivelled to the ground after large enough to begin cutting, evidently from a lack of water alone.

Cuttings have been made from two to five times in a season here. We feel sure that if irrigation could be applied, or this plant be set on moister land that double our yields could be realized from it.

As an example of what may be expected under high manuring the yield of 1892, the last crop cut from the original plat is shown below.

*Sixth Annual Report N. Y. Agricultural Experiment Station.—p. 422

The grapery had been built and a trench outside of the wall of the house filled with earth and manure, the same as the inside, two and one-half to three feet deep. There were five rows, and the yield from the row nearest the heavily manured trench was about six feet distant, but it showed so much gain from some source, and the manure trench was the only available source, that the rows and hills were cut and weighed separately to show the effect of heavy manuring on prickly comfrey.

It was in this year that fungus attacked the plat, and it was moved to give place to bulb growing by the Horticultural Division.

The plat was uncut until June 7th, when it had put out bloom, and was nearly ready to mature seed. The yields by rows from the number of hills named were as follows, the eleven heaviest yielding hills in the west row were nearest and opposite the trench mentioned above:

Number of Row, Counting from East toward Trench.	Number of Hills per Row Cut.	Yield per Row.	Yield per Acre.
		Lbs.	*Lbs.*
East Row	50	77.3125	14960.
Second Row	51	67.625	12820.
Third Row	50	70.50	13640.
Fourth Row	53	93.9375	17160.
Fifth Row	49	183.9375	36340.
Fifth Row	38	121.5	30940.
Fifth Row	11	62.7	54940.

The comfrey had rather a hard time of it with fungus during 1892, and the last of September was removed as above noted, and roots from the strongest, or undiseased hills, were used for stock in the new situation on the third terrace. The cultivation, hoeing and resetting is about all the record for comfrey in 1893.

Division of "hills" had to be resorted to in 1894 to keep the stand good, but the disease had been overcome, and three cuttings were afforded this year. Below are yields as cut and calculated per acre:

1894.	Yield Per Acre.
First cutting—June 6 to 10—960 pounds	6,720
Second cutting—July 13 to 18—781 pounds	5,467
Third cutting—September 7–15—1,375 pounds	9,625
Total	21,812
1895.	
First cutting—April 21–30—606 pounds	4,242
Second cutting—May 1–16—3,454 pounds	24,178
Total	28,420
1896.	
First cutting—May 1–10—835 pounds	5,845
May 21–June 11—1,300 pounds	9,100
July 22–August 2—480 pounds	3,360
Total	18,305

1897.	Yield Per Acre.
First cutting—May 17—546 pounds+?	5,460
Second cutting—June 21-25—780 pounds	7,800
Total	13,260

Dry weather caused the third growth to shrivel after it was nearly large enough to cut and the plants remained dormant the rest of the year.

1898.	Yield Per Acre.
First cutting—April 9 to 24—548 pounds	5,480
Second cutting—May 4 to 14—499 pounds	4,990
Third cutting—June 2 to 12—407 pounds	4,070
Fourth cutting—July 30—191 pounds	1,910
To al	16,450
1899.	
Cutting May 2-11—1,185* pounds	11,850
Cutting †July 22, August 3—2,102 pounds	13,478
Total	35,328

There was a promising start made for third growth, which will be large if cultivation is given before grass takes the lead.

VIII. WHEAT VARIETIES, 1899.

In the fall of 1898 sixteen samples of wheat from farmers in North Carolina were planted. This test of varieties was made on a plat which had grown a variety of legumes in that year, and the seed taken off where seed had ripened, and in two instances the whole crop was removed. These were a crop of peanuts and a bean vine, the seed of which was presented by Prof. Auguste deVillile from the Island of Reunion, a French province in the Indian Ocean, and which did not bloom, although a luxuriant growth of vines were secured.

The only manure used on this plat was slaked lime for the peanuts in 1898.

No manure was given the wheat. Wheat plats were laid off at right angles to rows of legumes.

Notes were made when the plats were beginning to approach maturity, as follows:

1. Everitt's High Grade.—Heads of average size; slightly bearded at top. Stems slightly inclined to bluish; medium height.
2. Fultz.—Very like No. 1. Difference very slight, if any at all. Heads lighter colored.

* At the first cutting the poultry yards were without green food, and a bunch was cut for each yard every day. No account was made of this, though it amounted to considerable in the aggregate.

† This was the first cutting in the new situation, where the area was .156 acre. The May cutting was from one-tenth acre.

3. Red Cross.—Heads light, golden green and larger at top than at base. Stems very blue and straw shorter than on plats 1, 2 or 4.
4. Fauntleroy.—Very golden; stems slightly inclined to bluish on top.
5. Bearded Fulcaster.—Tallest wheat on plat; leaves and stems green, the latter slightly inclined to bluish; large bearded heads; very even to where vines were removed in 1898, where straw is shorter; mixture of some beardless wheat in plat.
6. Red Russian.—Golden green heads; slightly bearded at top; stems green; slightly inclined to bluish; stature rather less than plats 5 and 8; contains a mixture of a few bearded stools.
7. Fultz Amber.—Beardless except slight tuft at top; rather golden heads; stems inclined to bluish; contains a few bearded stools; height about as No. 6.
8. Fulcaster.—Tallest wheat. (See plat 5.)
9. Davis.—Heads light golden; slightly bearded at top; taller than next, No. 10; slightly inclined to bluish; few bearded stools.
10. Kivett.—Stems green; heads golden green; slightly bearded at top; contains quite a sprinkling of bearded heads.
11. Little Red.—Heads short, small, light-colored; stems bluish; contains a few bearded heads.
12. Duplicate of No. 11, but from different source.
13. Harris Prolific.—Heads dark golden, large and long; stems green.
14. Little Red.—(See note for No. 11.)
15. Rice Wheat.—Stems green; heads golden; beardless.
16. A mixed wheat grown here at Experiment Farm in 1893, and kept in seed-room. Seed was a little rancid. The writer has noted at various times that seed which from age or some unfavorable condition has changed enough to be rancid to the taste will not grow.

This wheat failed to come up.

The following table shows the yields per acre of sheaf wheat, straw and chaff, and total grain, also the relative proportion of each as graded by the complete self-bagger, manufactured by Winston Agricultural Works, Winston, N. C.:

The highest yield was made by Fauntleroy, which for J. F. Homeward, Burlington, N. C., has this year averaged 20 bushels per acre on 90 acres.

The second best is one of the Fulcaster plats. Everitt's High Grade, Red Russian, and Fultz are the next in weight of yield. The Bearded Fulcaster stands the best chance where English sparrows are numerous, as these birds attack beardless wheat first, and do more damage to it than to the stiff bearded wheat.

The wheat was planted late, December 17, 1898.

YIELDS OF WHEAT, VARIETY TEST, 1899.—CALCULATED PER ACRE.

No of Plat.	NAME OF VARIETY.	SEED RECEIVED FROM	Weight of Wheat in Sheaf.	Straw and Chaff.	Cleaned Grain.	WHEAT GRADED INTO:		
						No. 1.	No. 2.	No. 3.
			Lbs. Per Acre.	*Lbs. Per Acre.*	*Bushels Per Acre.*			
1	Everitt's High Grade	J. F. Homeward, Burlington, N. C.	3744.1	2440.6	21.7	6.43	13.98	0.72
18	Everitt's High Grade	J. F. Homeward, Burlington, N. C.	2787.8	1858.5	15.5	3.02	11.22	0.98
2	Fultz	J. F. Homeward, Burlington, N. C.	3276.0	2008.1	21.1	7.09	12.86	0.66
19	Fultz	J. F. Homeward, Burlington, N. C.	2661.8	1724.6	15.8	1.25	11.75	2.10
3	Red Cross	J. F. Homeward, Burlington, N. C.	1886.2	1228.5	*10.96	1.77	7.81	1.18
20	Red Cross	J. F. Homeward, Burlington, N. C.	2071.1	1228.5	14.05	2.30	9.98	1.84
4	Fauntleroy	J. F. Homeward, Burlington, N. C.	3508.0	2228.6	*21.50	4.33	15.82	0.85
21	Fauntleroy	J. F. Homeward, Burlington, N. C.	4248.6	2575.1	27.89	9.32	17.48	0.79
5	Fulcaster Bearded	J. F. Homeward, Burlington, N. C.	3165.6	2016.	19.23	8.66	10.10	0.20
22	Fulcaster Bearded	J. F. Homeward, Burlington, N. C.	3720.9	2240.4	24.68	11.88	12.21	0.38
6	Red Russian	J. F. Homeward, Burlington, N. C.	3102.8	2077.1	†17.09	4.95	10.16	1.13
23	Red Russian	J. F. Homeward, Burlington, N. C.	2890.1	1578.9	21.84	4.66	15.55	1.45
7	Fultz or Amber	Dr. J. A. Wolf, Tobaccoville	3366.6	2260.1	18.43	4.07	12.53	1.58
8	Fulcaster Bearded	Dr. J. A. Wolf, Tobaccoville	3780.	2583.0	19.95	6.63	12.60	0.26
9	Davis	Dr. J. A. Wolf, Tobaccoville	2984.6	1913.6	17.85	5.05	11.35	0.92
10	Kivett	Dr. J. A. Wolf, Tobaccoville	2264.1	1366.3	14.84	3.74	9.38	0.85
11	Little Red	Dr. J. A. Wolf, Tobaccoville	2736.6	1740.4	16.60	0.98	10.76	4.40
12	Red Wheat	J. A. Long, Roxboro	2646.0	1638.0	‡16.80	3.54	11.29	1.51
13	Harris' Prolific	J. E. Harris, Hurdle's Mills	1547.4	952.9	9.91	1.71	16.99	1.58
16	Harris' Prolific	J. E. Harris, Hurdle's Mills	1759.0	1089.3	11.16	0.71	7.00	3.06
14	Little Red		2672.1	1677.4	16.54	1.44	11.81	3.08
17	Little Red	J. A. Wolf, Tobaccoville	2546.5	1653.8	14.88	0.44	8.82	5.54
15	Rice Wheat	J. E. Harris, Hurdle's Mills	2331.0	1531.7	12.99	5.38	7.09	0.26
			2856.4	1809.4	17.50			

*Damaged by birds and rats.

†Two sheaves were found with heads cut off by rats while stored in barn. Calculated for by two other similar sheaves in the above table.

‡Mr. Long says:—This wheat has been cultivated and kept up by our farmers for, I suppose, twenty years, and it has always been known as Red Wheat.